

## **AN EXPERIMENTAL TEST OF \*DLBA EFFECT ON SOME GROWTH PARAMETERS**

**Mohamed, M. M and M. S. Mohamed**

**Soil and Water Dept., Fac. of Agric., Al-Azhar Univ., Cairo, Egypt.**

### **ABSTRACT**

A pot experiment was conducted to investigate the effect of DLBA on grown plant parameters and nutrients content.

Twenty five kernels of wheat plants were planted in two kg of conditioned soil treatments. The agricultural management processes were introduced as the general recommendations of the agronomists. All the investigated parameters were improved due to the research treatments. The improvement was relatively correlated with the addition treatments.

Generally the results of Ismailia soil were more than the results of Nubaria soil.

### **INTRODUCTON**

Generally, applying soil conditioners improve most of soil properties, reduce germination failure and increase crop productivity De-Boodt, and Gabreils (1973), Fahim (1986), Omran (1994) and El-Mansi Nour (1999). All the previous researches reported that improving soil conditions by conditioners application increased dry weight and nutrient content of the grown plants.

The first part (Mohamed, 2004) of this work cleared the positive effect of DLBA on improving the soil properties. The present part aims to test its effect on some plant growth parameter.

### **MATERIALS AND METHODS**

Surface disturbed (0–30 cm depth) soil samples were collected from Ismailia and Nubaria regions. The samples were prepared for the research purposes and analysis. Soil portions from each sample were conditioned with 0.0, 0.1, 0.2 and 0.5 % of DLBA. The soil analysis stated that Ismalia soil was sandy texture; (sand 88.49 % , silt 5.5 % and clay 6.00%), 7.1 = PH , 1.23 % CaCO<sub>3</sub> , 0.30 % 0.M and 0.31 dcm<sup>-1</sup> EC, while Nubaria soil was sandy loam in texture (sand 74.92 % , silt 10.89 % and clay 14.19 % ), 7.8 pH, 17.44 % CaCO<sub>3</sub> , 0.51 % 0.M and 0.83 dcm<sup>-1</sup> EC.

Two kg portions from each conditioned soil treatments were passed through a 4 mm sieve and packed in plastic pots (15 cm inside diameter), and used in three replicates for each treatment. Each pot was planted with 25 wheat (*Triticum aestivum*, Sakha 69) kernels and irrigated to its moisture field capacity. Water loss from the pots was replaced twice a week. Germination percentage was recorded after 10 days from sowing. At the end of the

---

\* DLBA : nonionic surfactant, granules, hydrophilic, yellowish white, density : 0.54 gm/cm<sup>3</sup> and PH : 5.3 , Micich, and Linfield, (1986).

second week, 0.5 g of both KNO<sub>3</sub> and K<sub>3</sub> PO<sub>4</sub> were applied to each pot as a chemical fertilizers. The plant shoots were harvested above the soil surface after 50 days from cultivation. Then washed, dried at 70°, ground and kept for analysis. Portions from the plant materials were taken to determine their nitrogen, phosphorous and potassium contents according to Chapman and Pratt, ( 1961). Also soil portions were taken from each treatment after the experiment duration and analysed for their content from N, P, K, Fe, Zn, Mn , and Cu according to the general methods of Black ( 1965).

## RESULTS AND DISCUSSION

### I- Effect of DLBA addition on some soil chemical properties and some nutrients content after the experiment duration.

Table (1) shows the slight increase in all the soil estimated parameters. This increase was gradual according to the investigated treatments; i.e. as DLBA conditioner increases the soil parameter increases. Also, the nutrients content was a dependent value upon the DLBA ratio; reflecting DLBA holding capacity for nutrients due to the increase in soil C.E.C. In addition, the organic matter content increase due to the treatments effect and the residual plant parts.

These results for pH values may be attributed to many factors such as the acidity of conditioner used ( pH = 5.8 ).

**Table (1): Effect of DLBA additions on some soil chemical properties and nutrients holding capacity after the experiment duration**

Treatment	pH	EC dcm <sup>-1</sup>	CEC Mol kg <sup>-1</sup>	O.M %	Macro elements ( ppm)			Micro elements (ppm)			
					N	P	K	Fe	Mn	Zn	Cu
<b>Ismalia soil</b>											
<b>Control</b>	7.12	0.81	3.40	0.30	39.71	8.91	89.30	1.00	1.23	0.51	0.20
<b>0.1%</b>	7.11	1.51	3.55	0.34	47.13	9.50	90.10	1.10	1.24	0.59	0.25
<b>0.2 %</b>	7.10	1.55	3.87	0.35	55.11	9.81	91.55	1.20	1.25	0.63	0.29
<b>0.5 %</b>	7.09	1.93	3.99	0.36	59.01	9.93	92.33	1.23	1.30	0.66	0.31
<b>Nubaria soil</b>											
<b>Control</b>	7.95	1.08	15.18	0.51	78.00	7.98	95.15	1.78	2.09	0.75	0.39
<b>0.1 %</b>	7.93	1.88	15.98	0.59	80.30	8.10	96.53	1.87	2.11	0.75	0.41
<b>0.2 %</b>	7.92	1.95	16.19	0.63	83.51	8.15	97.44	1.91	2.19	0.80	0.45
<b>0.5 %</b>	7.90	1.99	16.91	0.65	85.69	8.96	97.91	1.98	2.21	0.83	0.46

Concerning the two investigated soils; the increase in the values of all the estimated parameters for Ismailia soil sample were more than those of Nubaria one.

The obtained results table( 1) are in agreement with those of Mohamed (1990) and Abdullah (2004).

**II. Effect of DLBA additions on germination and growth parameters of wheat plant.**

Data in table (2) show the effect of DLBA additions on germination percentage in sandy and calcareous soils treatments. In Ismailia soil, DLBA used increased germination percentages after 10 day from planting from 61.32 % to 77.32 %, 81.32 % and 85.32 % for control, 0.1 %, 0.2 % and 0.5 % treatments respectively. While for Nubaria soil were 48.00 %, 76.00, 77.32 and 82.68 % for the same treatments used. These results approved that the probable hard crust of calcium carbonate that usually occur in calcareous soils was apparently softened by DLBA used, also in the case of wettable soil (treated with hydrophilic materials), water films are present around the individual or aggregated soil particles and the moisture percentage of the soil surface is suitable for germination. However, improvement of soil physical conditions due to the conditioner additions to these soils was also favorable to seeds germination and other requirements for plant growth.

**Table (2): Effect of the conditioned soils by DLBA treatments on the investigated plant germination %, dry matter, N.P.K. contents and uptake.**

Treatment	Germination %	Dry matter g/pot	N Content %	P Content %	K Content %	N Uptake mg/pot	P uptake mg/pot	K uptake mg/pot
<b>Ismalia soil</b>								
<b>Control</b>	61.32	6.93	0.66	0.10	0.28	45.7	6.90	19.4
<b>0.1 %</b>	77.32	7.06	0.78	0.11	0.36	55.1	7.80	25.4
<b>0.2 %</b>	81.32	7.28	0.87	0.16	0.39	63.3	11.70	28.4
<b>0.5 %</b>	85.32	7.33	0.92	0.18	0.40	67.4	13.20	29.3
<b>Nubaria soil</b>								
<b>Control</b>	48.00	5.89	0.61	0.08	0.20	35.9	4.70	11.8
<b>0.1 %</b>	76.00	5.93	0.75	0.09	0.21	44.5	5.30	12.5
<b>0.2 %</b>	77.32	6.36	0.81	0.11	0.29	51.5	7.00	18.4
<b>0.5 %</b>	82.68	6.69	0.90	0.15	0.36	60.2	10.00	24.1

These results are similar to those obtained by De-vleschuwar Gabriels (1976), El-Hady Tayl ( 1981 ) and Yassein ( 1989 ).

Data in table (2) show the dry weight and N,P and K contents of wheat plants in both investigated soil, treatments.

It is observed from the data of Ismailia soil that the addition of soil conditioner led to 5.8 % increase in plant dry weight over the control treatment for 0.5 % addition rate, and 13.6 % in Nubaria soil.

Concerning the N.P.K. contents and uptake the values indicate that increasing the addition rates of soil conditioner increases N.P.K contents and uptake in both soils used.

Similar results for other hydrophilic conditioners were obtained by Mohamed. (1990), Arafat and Rasheed (1992), and Nawar (2002).

## REFERENCES

- Abdullah, M.M.F. ( 2004), Effect of some soil conditioner and growth regulators on water consumptive use and plant growth in some desert soils. M. Sc. Thesis, Fac. of Agric. Al-Azhar Univ. Cairo.
- Arafat, S.M. and M.A. Rasheed (1992): Beneficial effect of filter mud on agro-chemical characteristics of sandy soil. Zagazig J. Agric. Res. 19, (4) 1907 – 1915.
- Black, C.A. (1965): Methods of soil Analysis, Chemical and Microbiological Properties. No (9) in series agronomy.
- Chapmans, H.D. and P.F. and P.F. Pratt (1961): Methods of analysis for soils, plants water. Agric, Publ. Univ. of California reverside.
- De-Boodt, M. and Gabriels, D. (1973): The effect of synthetic soil conditioners on the physical fertility of soils and in particular on the germination of sugar beets. Gemblouk Belgium, Sept. 3-7, 106.
- De-Vleschuwar, D. and Gabriels. (1976): the effect of Polyacrylamide treatment on the germination of sugar beets in sandy loam soil. Med. Fac. 1 and 6 ouww: Rijsuniv. Gent 41/1-1976; 321.
- El-Hady, O.A. and M.Y. Tayel (1981). Germination as affected by soil conditioners. Egypt. J. Soil. Sci. special Issue.
- El-Mansi, A.A.A and E. M. Nour (1999). Studies on some factors affecting growth and yield of pea under sandy soil conditions using drip irrigation system. Zagazig J. Agric. Rec. Vol. 26 (5):
- Fahim, M.M. ( 1986): Effect of soil conditioners on some physical and chemical properties in some soils. Ph. D. thesis, Fac, of Agric. Moshtohor, Zagazig Univ.
- Micich, T.J. and linfield, W.M(1986): Nonionic suractant amides as soil wetting agents. JAOCs. Vol. 63 No. 10, 1385 – 1391.
- Mohamed, M.M. (1990): Effect of soil management practices on soil properties and yield. PH.D. thesis Fac. Of Agric. Al-Azhar Univ. Cairo.
- Mohamed, M.M (2004)” An experimental test of a nonionic surfactant DLBA as a soil conditioner. S.agric sci mansoura univ. 29(12) 7617- 7623 .
- Nawar, A.A.A. (2002): The potentiality for improving some soil properties and plant growth in sandy soils by using soil amendment, M.Sc. Thesis Fac. of Agric. Al-Azhar Univ.
- Omran, W.M. (1994): Effect of some polymers on some physical properties and plant growth in some new reclaimed soils. M.Sc. Thesis, Fac. of Agric., Menoufia Univ., Egypt.

Yassein H.A. (1989): Effect of some soil improvement techniques on physical properties of sandy and calcareous soils. Ph.D. Thesis Fac. of Agric., Al-Azhar Univ. Cairo.

### **اختبار تجريبي لتأثير مركب DLBA على بعض مقاييس النمو**

**محمد مصطفى محمد ، مجدى شاهين محمد**  
**قسم الأراضي والمياه - كلية الزراعة - جامعة الأزهر - القاهرة**

تم هذا البحث لدراسة تأثير استخدام محسن تربة جديد DLBA على خواص التربة الكيميائية والانبات ومحصول المادة الجافة والمحتوى العنصرى لنبات القمح المزروع فى اراضى رملية وجيرية .

اقامت تجربة اصص بزراعة ٢٥ حبة قمح ( سخا ٦٩ ) فى ٢ كيلو جرام من الحبيبات الارضية المضاف إليها المحسن بمعدلات 0.5% , 0.1 , 0.2 بثلاث مكررات لكل معاملة. تم ضبط المستوى الرطوبى طول التجربة عند السعة الحقلية . سجلت النسبة المئوية للانبات بعد ١٠ أيام من بدء التجربة وتم حصاد التجربة بعد ٥٠ يوم من الزراعة وقدرت خواص التربة والنبات بعد الحصاد وكانت الأتي :  
أوضحت النتائج أن إضافة المحسن الجديد أدت إلى زيادة قيم السعة التبادلية الكاتيونية والمادة العضوية والتوصيل الكهربى للتربة وكذلك نسبة الانبات .

زاد محصول المادة الجافة والمحتوى العنصرى من النيتروجين والفوسفور والبوتاسيوم فى نبات القمح بزيادة معدلات الاضافة من المحسن المضاف .

وترجع هذه النتائج المتحصل عليها سواء للتربة أو النبات إلى تأثير المحسن المضاف فى تحسين الظروف الأرضية لنمو النبات عموماً.